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ABSTRACT

This paper presents one researcher's premise that the most important variable in determining classroom effectiveness is the congruence of the delivered curriculum with the desired outcomes or, that students be given the opportunity to learn what is expected of them. This theory presupposes that curriculum expectations be made clear to students, and that students be given sufficient time and resources to achieve those expectations. The role of administrators is therefore to make these expectations clear to teachers, to provide teachers with the means to carry them out, and to assure that teachers do carry the goals out. Teachers and administrators must share a common belief that certain outcomes are expected for students at a given grade level in a given school. Evaluation devices must also be geared precisely to these specific curricular goals. Three important related concepts are defined and discussed: allocated time, engaged time, and success rate. These concepts are then brought together into a single concept of academic learning time, defined as engaged time with materials or activities that produce a high success rate and are related to outcome measures. This concept of academic learning time is shown to be a good predictor of classroom effectiveness. The paper concludes with general observations on the utility of research in assessing teacher effectiveness. (TE)

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RESEARCH AND TEACHER EFFECTIVENESS

Remarks by
David Berliner
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University of Arizona

In deciding what I can share with you from my research background that might help you in your job of making schools more effective, I have decided to present a few rather simple propositions that are worth considering seriously as you visit classrooms. I understand most of you are principals and I think that you probably recognize that the whole movement toward effective schools rests on principals' shoulders. Whether you like it or not, you have ended up on the spot and it means a new role for some principals, an instructional leadership role. If you have not been visiting classrooms a lot, you are going to be pressured to do so. And when you get into the classrooms, you need certain kinds of spectacles to look at what goes on. I am going to try to provide you with some of those spectacles today--what to look for and what to think about as you visit classrooms.

I boiled down a lot of what I wanted to say into a single variable or single statement. It seems to me that the single most important variable in determining whether or not you have an effective classroom is whether or not the delivered curriculum of that classroom is linked logically or empirically to the outcomes that are desired. This is such a deceptively simple statement that it obviously needs elaboration. First of all it is concerned with what is sometimes called curriculum alignment, the congruence of the curriculum with the outcome, the overlap of curriculum with outcomes, or as it is most often called in the research community, opportunity to learn.

A student must have the opportunity to learn what it is that is expected of him or her. For certain subjects, it's crucial. You do not ordinarily learn trigonometry at home. The family is an important educator, but families do not teach trigonometry. There are lots of school curriculum areas that families don't help with. Some social studies can be learned around the table at home, but chemistry isn't usually learned at home. There are parts of the school curriculum that will only be learned if we expose our children to it in schools. Otherwise, they will never get exposed to some things we deem valuable.

What is expected of the student must be made clear to the student. The opportunity to learn it must be provided. If we have to make clear to the students what it is we expect of them, then please notice that what is expected must be clear to the teacher--

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crystal clear. A teacher who does not know what is expected--what outcomes are desired--has been abandoned by the administrative staff of the district. That is a harsh statement. But if I talk to a teacher who says, "I don't know what anybody wants around here", I'm pretty sure where the blame is. I think it has to do with the administrative staff of a district not taking responsibility for saying, "this is what's expected." In addition, I would add that a teacher who knows the outcomes that are desired, but doesn't work toward them, is probably unmonitored by the administrative team of a district. Monitoring whether classes are doing work related to outcomes that are valued is a proper concern of administrators. If teachers do not know or do not work toward desired outcomes, what takes place is more like babysitting than it is education. Some of the oldest issues in education revolve around this problem. We need to know what knowledge or skills are worth acquiring. To repeat the title of a famous article at the turn of the century, we need to know "What knowledge is of most worth." The teachers and the administrators of a school district simply have to share a common belief that certain outcomes are expected for students at a given grade level in a given school.

I would remind you that the whole concept of effectiveness which brings you here today hinges on valuing some set of outcomes. You cannot talk about effectiveness unless you talk about what it is you are trying to teach. The outcomes issue is primary in discussions of effectiveness. Good teaching is a logical issue. It need not produce learning. A teacher who starts a lecture on time, provides a review, gives an advance organizer, emphasizes important points, asks higher order questions throughout, summarizes key issues, cracks a good joke, etc., may be judged to be a good teacher whether or not the students learn. Good and poor teaching is determined by values and knowledge of what standards of practice are. A doctor may have patients that die, but if the doctor used the best practices, she may be judged to be a good physician. An effective physician however, is associated with many fewer deaths. The outcomes for medicine are manifestly clear, and effectiveness is, therefore, easy to judge. The outcome for educators must also be made clear or we will not ever be able to judge effectiveness.

Please note, also, that we need not have 97 objectives for reading, 74 for math, 85 for science and a few hundred others for pro-social behavior and physical education. The behavioral objectives movement, I hope, is past the day when it forced too molecular a view on people and trivialized teaching and learning. We should not, however, throw out the baby with the bath water. Ten to 15 objectives for reading, another dozen or so for math, and another dozen or so for the rest of the curriculum are reasonable goals to shoot for. For a single course in the junior high or senior high level a dozen or so objectives is all that is necessary to proceed to thinking about effectiveness. But effectiveness cannot even be discussed without outcomes being prevalent in your mind.

Outcomes do not necessarily have to be test scores. As educators, we all have a legitimate interest in striving for dozens of outcomes for which no acceptable tests exist. For example, we usually state that we want to develop cooperative behavior among our students. This is an outcome we rightly value and for which no acceptable tests exist. In this case, effectiveness is still judged by determining if the curriculum delivered is logically matched to the outcomes desired. You don't always need a test, you can collect evidence by observation. Effectiveness can be judged by observing classroom processes and analyzing if such processes are related to the intentions of the district. A classroom that has downgraded competition and has implemented cooperative learning structures, uses criterion-referenced rather than norm-referenced tests, rewards helping behavior, etc., is one that is delivering a curriculum related to desired outcomes. If, however, tests are used as outcomes, then a concern for effectiveness means you should match the test to the curriculum. If you are evaluated with a test that is viewed as an indicator of the outcomes of education, but which is not matched to your curriculum, you are in deep trouble. You cannot possibly be effective as a school or a teacher if you have taught one thing but have allowed your students to be tested on something else.

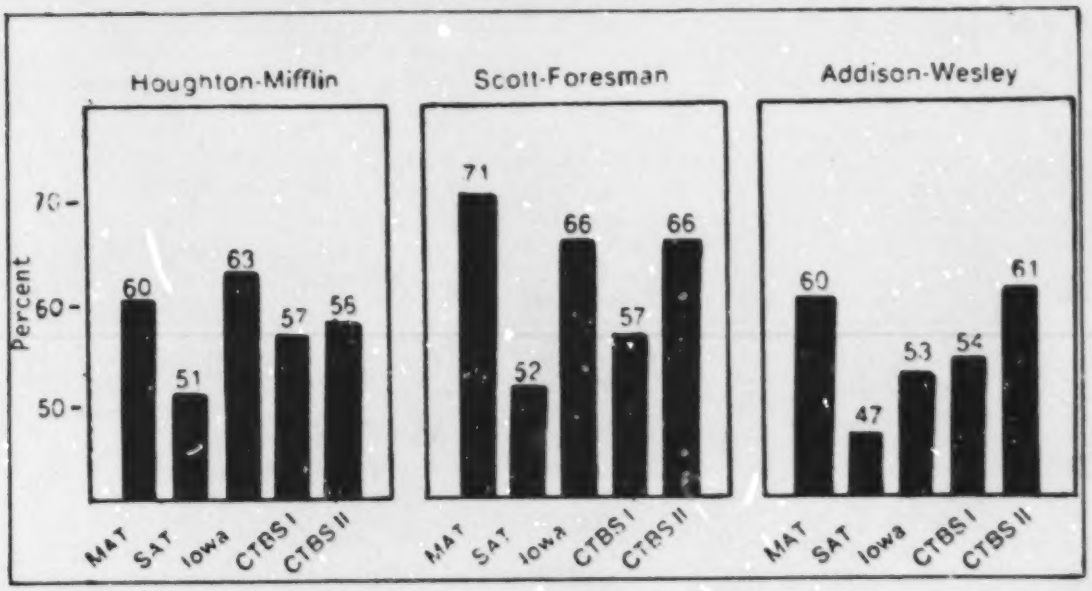
Are we educators so foolish that we have allowed ourselves to be trapped in so untenable a position? Is it possible that we actually use tests that are not matched to our curriculum, and in that way, vastly underestimate the productivity and effectiveness of our schools? I'd like to share with you some of the data to make you think about the link that has to occur between curriculum and outcome to even start to talk about effectiveness.

The study I cite has to do with the match between leading textbook series and some of the leading indicators, the tests, that are used around the nation to judge educational productivity and teacher effectiveness. At the fourth grade level, an analysis was done of every item in the textbooks of the Houghton-Mifflin, Scott Foresman, and Addison-Wesley series and every item on the math test included in five different standardized tests used to evaluate instruction at that grade level. The interesting question is: what is the overlap? Well, in the worst case, where a school district might be using the Addison-Wesley series and using the SAT as an outcome measure, there was 47% overlap, meaning 53% of the items on that test may never have been seen by the students before! (Figure 1)

I come from Arizona. The school districts in my area have had these data since the day I gave it to them about three years ago. They are still using a curriculum series and a standardized test that do not match. We know education is slow to change, but it is time to stop punishing ourselves this way. We have to ask questions about the instrumentation we use to judge effectiveness. If your curriculum and your tests don't match, you are in trouble. In the best case with the Scott-Foresman series and with the MAT, 71% of what the students faced on the test were things they experienced in the text;

30% were not. We are vastly underestimating our effectiveness when we allow ourselves to get trapped this way. We should never have outcomes that don't match what we do in our classes. So, to deal with the effectiveness issue you have to deal with outcomes and you have to deal with the curriculum, and ask whether they are sensibly aligned.

Figure 1. The Percent of Items Common to Both Texts and Tests in Regular Use in Elementary School Classes.



My first point is simply that the effective teacher has to have a match between the curriculum and the outcomes. You can't talk about effectiveness otherwise. Students must have the opportunity to learn what is on the test used to assess learning. But I said that it was the delivered curriculum that must be matched to outcomes. What do I mean by that? What does the term delivered mean? The way I use it, I define it as the involvement of students with materials, activities, ideas, concepts, and issues in which they have a marked degree of success. That to me signifies that a system is delivering a curriculum. Students are engaged and they are succeeding at something. That's the delivery system. A curriculum is delivered when students in a class show that they are engaged with and succeeding to learn what they are supposed to learn.

Three concepts are important here, and I want to go over them: Allocated Time, Engaged Time and Success Rate. I've discussed these before. I've written about them. The work I did at the Far West Laboratory a number of years ago revolved around them, but I continue to speak about them because you need to think about them as you go about your work in trying to improve schools.

Allocated Time

Let me start with the concept of allocated time. There is a positive relationship between the time allocated in instruction and achievement. Not every study shows it and when it's found it's not always a very strong predictor of achievement, but in general, the relationship between the time that's allocated to a curriculum area and the achievement in that area is positive and substantial.

When I first told my father I was studying the relationship of time to achievement, he started asking me questions. My father was a bit curious about how I made a living studying how time and learning are related. He said, "You mean you find out that you spend more time and you learn more?" I said "yes", and he burst out laughing and said, "Boy, you've really got them all conned. Does the government support that?" I said, once again, "yes". He said, "I'm sure glad I don't pay taxes anymore!" But I think I finally turned him around when I explained to him that the finding was not really that time and achievement are in some way related. The finding that is important, and one which every educator has to deal with, is that the variability in the allocations of time across classes is enormous. Teachers make those time allocation decisions, and they are very important. Principals do not know what goes on behind the closed doors of classrooms. School superintendents don't know; state boards of education don't know. Teachers are making a set of complex decisions. Sometimes they are wonderful decisions, sometimes they are not.

TABLE 1
ALLOCATED TIME DECISIONS FOR READING AND MATHEMATICS IN SELECTED GRADE TWO AND GRADE FIVE CLASSES

Grade Two				Grade Five			
Reading		Mathematics		Reading		Mathematics	
Class	Allocated Minutes	Class	Allocated Minutes	Class	Allocated Minutes	Class	Allocated Minutes
A	47	F	16	N	68	R	20
B	66	G	24	M	88	S	36
C	85	H	35	O	102	T	53
D	103	I	42	P	121	U	64
E	118	J	51	Q	137	V	73
Range=71 min/day		Range=35 min/day		Range=69 min/day		Range=53 min/day	

Adapted from Dishaw, 1977 (a) & 1977 (b)

In Table 1 we present examples from our second and fifth grade reading and mathematics data. This is the daily time allocated to mathematics by the teacher in these elementary classrooms. What is of great interest is the variability. One teacher in the 5th grade allocates 20 minutes a day to mathematics, another allocates 73 minutes a day. They're working with the same length of the school day and one is providing 20 minutes, the other 73 minutes. It's easy to tell which class is likely to do better on the state test of achievement. I really don't know how much time should be spent on math. I also don't know what's the maximum time students can spend at math before going bonkers. I am sure, however, that 20 minutes a day is inappropriate. If you go into classrooms you ought to consider the time variable.

With the grade five reading data the issue is again not how much time, on the average, is spent in reading (Table 1). The question is: What factors make one teacher allocate 68 minutes to reading and another one 137 minutes to reading? Two hours of time in a curriculum area is very different from one hour of time in a curriculum area. It's twice as much. What happens in a school to allow that?

The allocations of time to the curriculum areas are determined by the elementary school teachers. At the junior highs and at the senior highs those times are fixed. The next question about allocation, then, is: How much time is allocated within the subject matter area to particular content areas? Both the junior and senior high teacher has to decide how much time to spend on two column addition, on quadratic equations, on ecology, or biology, etc. Again the issue is variation. For example, in the area of fractions, over 90 or so days one teacher spent zero time on fractions. Another teacher spent 400 minutes teaching fractions to her class. The state required fractions at this grade, but this teacher did not spend any time on fractions. I asked the teacher at the end of the study, "You know, you didn't spend any time on fractions." The teacher said, "Really?" I said, "Yes." The teacher said, "I don't like fractions."

My first response was anger but my second response was, I think, much more appropriate. The fact is that none of us do what it is we don't want to do, and we confuse our personal decisions with our professional decisions. The teacher was making a personal decision--I don't like it so I'll leave it out. Teachers need to make professional decisions. Very few teachers are reminded of this. A feedback system is missing. If they drop an area of the curriculum out because they don't like it, nobody is there to notice. There is not any feedback among teachers or by the instructional leaders to prevent this from happening.

What has become clear from the research at Michigan State University is that the decisions made by teachers about what content to teach are based on three factors: how much they like the area; how much preparation the area requires for them; and how difficult they

perceive it to be for their students. Teachers hate to torture their students. So, if they think it's going to be difficult for their kids they might drop something out. Those are personal decisions. I am not sure they are proper professional decisions. Since nobody is giving teachers feedback, we are always in danger of getting variability like this.

TABLE 2
ALLOCATED TIME DECISIONS IN DIFFERENT CONTENT AREAS
FOR READING (GRADE 5) AND MATHEMATICS (GRADE 2)

READING & LANGUAGE ARTS	Total Allocated Minutes				MATHEMATICS	Total Allocated Minutes			
Content Area	Class 1	Class 3	Class 11	Class 25	Content Area	Class 3	Class 21	Class 8	Class 13
Comprehension Activities: Synthesis & Inference	235	252	1432	306	Computation: Speed Tests	232	31	71	100
Comprehension Activities: Translation & Paraphrasing	122	151	1649	383	Word Problems	109	226	416	132
Oral Reading	604	63	885	305	Fractions	0	21	63	399
Creative Writing	56	343	98	573	Linear Measurement	29	130	107	400

Adapted from Dishaw 1977 (a) & 1977 (b); A more complete discussion of these data may be found in Berliner, 1979.

The same is true of the reading area. The allocation of time there becomes important because of what is now a national concern, the area of comprehension. Allocated time in comprehension in these classrooms is presented in Table 2. In one classroom the average child spends 122 minutes doing translating and paraphrasing, 235 minutes in inference and synthesis activities. These children are trying to read something and answer the question, what does it mean? They have to put it in their own words. Now, those of you who have been around in the last decade know that students couldn't decode anything back in the 1960s and up to the 1970s. In this decade, they decode fine; they just can't understand anything! That seems to be a national concern. Well, if that's true, one of the reasons that one might be concerned about time is whether, in fact, students are getting any instruction in comprehending. One of these classrooms manages to total about 400 minutes in comprehension activities in its reading and language arts program. As is seen on Table 2, another classroom gets 3,000 minutes of such instruction. It's not

very difficult to figure out which classroom is likely to do better on that one item on the State test that says: "Read this paragraph and tell me which of the following statements is the best title for the paragraph." It's a comprehension item, and it's on every test from about third grade through college entrance. The allocation of time, the decisions about what content to teach and how much time to put in are very crucial decisions and they are often made without much discussion with and feedback to teachers.

Engaged Time

The next concept that has to be dealt with in talking about instructional delivery is the issue of engaged time. The issue of engaged time is not very startling either. My father would be incredulous, once again, when he said, "You mean if kids pay attention they learn more?" As I said, "Yes," he'd laugh again and wonder how you make a living telling people such startling news! The issue has nothing to do with that common sense finding. The issue is, do classrooms vary enormously in the mean engaged time recorded for the class? The answer, again, is yes. In one classroom you find 50% of the students engaged at any one time you are looking. In another classroom 90% of the students are engaged at all times. What's the difference between the two classrooms? What does it mean for the delivered curriculum? Very simply, if a teacher has a 50 minute allocation to math, and 50% engagement, the children are getting 25 minutes a day. If there is 90% engagement, the students get 45 minutes a day. That's 20 minutes a day difference in time. That equals 100 minutes a week. Those are big blocks of instructional time. What is delivered in sheer amount of curriculum to students in two different classrooms may be very, very different.

It is interesting to think about the delivery of curriculum and the time variables as follows. We can start by thinking of a school year, and then must say but it's not a "year", it's only 9 months or 180 days. But then, it's not really 180 days, because we have to subtract from that. What do we have to subtract? Well, the teacher is absent once in a while, the kids are absent once in a while, the teacher takes a mental health day once in a while, the buses break down, snow occurs and you don't make up the day, etc. What are we back to in terms of instructional days in a district? 150 at most? Let's say 150 instructional days. I don't think that's uncommon. And let's say many of the early grades are allocating 30 minutes a day to mathematics at a 50% engagement rate. You then are delivering 15 minutes a day of mathematics. Lets go over that again. If 30 minutes a day is what is allocated for 150 days, that gives you 75 hours of mathematics instruction for the entire school "year." And if the engagement rate is 50 percent, then what's delivered in mathematics is 37-1/2 hours of time on task. By adult standards, that's under one week's work. It is not any wonder to me, when I think about standardized testing programs, that getting two items right can give you 8 months advantage on those tests. If all we're

delivering in certain classrooms is 40 hours of delivered curriculum in math, about two items more is all you can expect for the whole year.

Now, these kinds of data are not meant to say that all teachers are like this and that every classroom suffers. But if you're talking about school effectiveness, you might want to find those classes where these kinds of data are obtained. Maybe it's 20% of the classes in your district; maybe it's 15%. But whatever the number, those classes can be helped because these are remediable kinds of variables. If you want a more effective school, you've got to get more instruction delivered. It's not a very difficult concept to deal with. We worked in schools where we were able to peek in classrooms that we weren't invited to look in. All of our teachers were volunteers, but because many of them were in pod schools, you could sit in the center of the pod and watch the teacher who invited you, and all the other teachers, without them knowing. An interesting question is: What's delivered in some of those classrooms that we weren't invited into? We had the feeling that some large percent, somewhere between 5 and 15 percent of the school classrooms were not delivering 100 hours, total, in reading and math, in the elementary grade levels! Do you want to have a more effective school system? Find those classrooms and provide feedback for those teachers. Most of them didn't know what they were actually delivering. They aren't used to thinking that way. These concepts help you to think about classrooms and, thank goodness, the numerical values of variables like how much instruction is being delivered are easy to change.

The engaged time variable, we think, is very important. After we finished this project, I went to the library to do some further research on what we had done. I found out that we had replicated the results of somebody who did this study in 1888. In fact, the issue of time and instruction is on a 20 year cycle. A man named Curry in 1884, and then Judd again in 1918, and then some people in the 1930s, and Phil Jackson in the 1960s, and then some of us in the 70s and 80s are part of the cyclical discovery of time variables. Everyone says time is important, and every 20 years someone says not enough of it is being spent. People are concerned about time. It's not a magic variable; it's not a very complex variable. But the allocations of time to instructional areas and then the engaged time in those instructional areas are very important concepts with which to think about classrooms.

Success Rate

The next concept I want to deal with is that of success rate. Again, in our study, we found something we think gets rediscovered every now and then. That is the concept of success for young children. We studied whether the children were succeeding at what they were doing or whether the material was too difficult for them. Our thinking was that the match of curriculum to a child is an

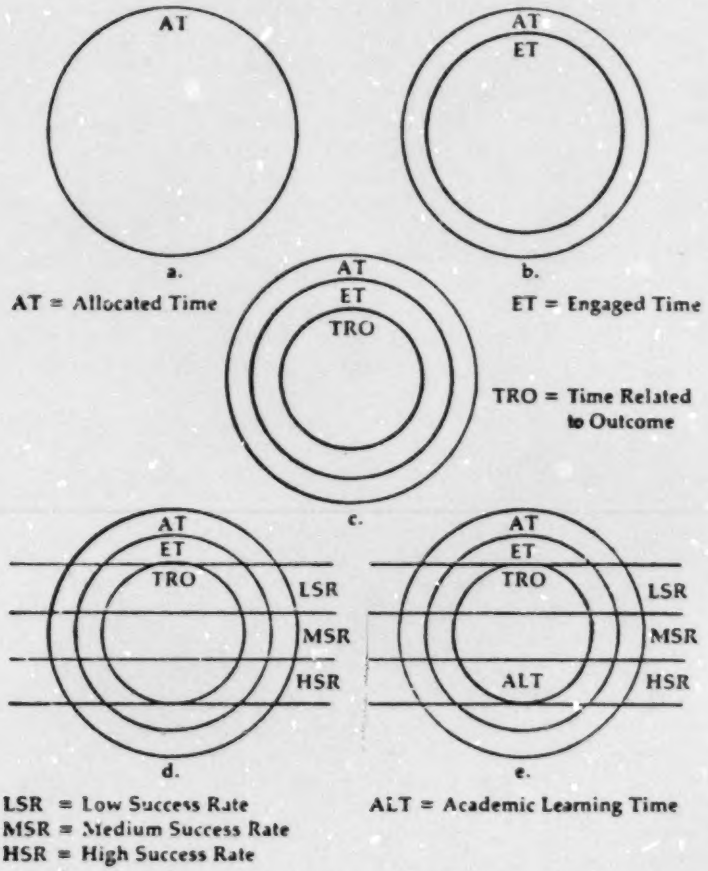
important and very complex teacher behavior. And of course teachers are not sadists. If they see children failing at something, they change the curriculum as quickly as possible. Nevertheless, in our study we did find classrooms where 14% of the school day would be coded by our observers as high failure experiences. Students were constantly failing. Would you like to have a predictor of failing performance on outcome measures? Failing performance in a classroom is a very good one!

If a child can't do two column addition in a classroom, a child is not going to do two column addition on an outcome measure. If a child succeeds at two column addition in the classroom, it's very likely the child will do well on a two column addition problem on the outcome. So, looking at the success and failure rates within a classroom becomes an important concern. In our study, we found that high success was incredibly important for young children. Jere Brophy and Barak Rosenshine, researchers in this area, say that unless recitation activites are at the 80% success rate they're likely not to produce much achievement, and unless seatwork or homework is up around 95% success, they may not have much value. And that seems particularly true in those areas of the curriculum that are hierarchically formed, like mathematics. If you don't really learn addition, you're going to have trouble with multiplication, and if you don't really learn subtraction, you're going to have trouble with long division. There are lots of areas of the curriculum that are hierarchically formed, and it means that success early in the curriculum does determine success later in the curriculum. Our data are clear on this for young children. Thus success rate becomes an important variable for thinking about classroom instruction.

Academic Learning Time

I've talked about allocations of time and I've talked about engaged time and I've talked about success rate and I want to bring those together for you, in the single concept that I think is one of the important ones to think about when you go into classrooms. It's the concept we called academic learning time, ALT. One of the products of the many recent studies of teaching that I think is important is this ALT variable. We've defined it in our work as engaged time with materials or activities that produce a high success rate and that are related to the outcome measures that are being used. It characterizes a lot about what I've said about the alignment of curriculum with outcomes and about the time variables. Let me try to define it better with a diagram (Figure 2). We said that the allocation of time at the junior and senior high schools is fixed, but at the elementary schools the teachers make the decision of how much time to give to music, reading, math, etc. We started with the notion that there is an allocation of time. The next concept we analyzed was engaged time which is some subset of the allocated time. You don't expect these variable to be equal. That

Figure 2. Defining Academic Learning Time (ALT).



Interpretation: The time allocated for instruction is shown visually in (a). During some of this time, students are engaged, as shown in (b). Some of the time students are engaged is time related to the outcome measures that are used to assess instruction. This is shown visually in (c). The time allocated, whether engaged or not, and whether related to the outcome measures or not, can by yielding low, medium, or high success rates for students (d). That portion of allocated time that is time engaged in activities related to the outcome measures and which provides students with a high success rate is defined as Academic Learning Time, as shown in (e).

is, you don't expect 100% engaged time. It's a subset. 90% would be nice, 85% would be nice. 20% would be bad.

We also said that you could conceive of the success rates of students when you're working with them: some of the time they are engaged they will be having high success; some of the time they are engaged they will be having medium success; and some of the time they will experience very low success. And you sort of hope that the amount of time they spend in low success activities would be small because failure is not good on a regular basis. Moreover, in our work, we found out that high success was an extremely important predictor of achievement.

So these are the concepts we have worked on so far, allocated time, engaged time, and success rate. I started off by saying one of the key variables was whether the curriculum is related to the outcome. Well we don't expect everything a teacher does to be related to outcomes. If we did we'd have automatons as teachers. There'd be no spontaneity; there'd be no fun in teaching. The biggest criticism of Becker and Englemann's programs, the Distar programs, is not that they don't work, because they do. The biggest criticism is that they force teachers into reading from manuals, pointing when they're supposed to, having students chant when they're supposed to, etc. Every part of the teacher's activity is, in fact, related to the outcomes as defined by Becker and Englemann, and it drives a lot of teachers to drink at an early age. Not everything that's going to happen in classrooms is expected to be related to the outcomes. If a teacher is teaching a geometry lesson and somebody says, "that's a beautiful shape," it's perfectly sensible that the teacher would talk about how the concepts of beauty and the concepts of geometry were once wedded and that the history of Western civilization is based on philosophy and mathematics being intertwined. Nevertheless, some part of the teaching act ought to be related to the outcomes. I've never seen a geometry test that asked about beauty. I have seen many geometry tests that check if students know the number of angles that are equal in an isosceles triangle. And the teacher is there to teach some things like that.

Now, let's put this all together as we have in Figure 2. We say that some part of the allocation of time, whether it's fixed or variable, depending on grade level, is engaged time. Some part of that time is also related to the outcomes, and some part of that time is high success. We're calling that intersecting zone academic learning time. You can measure it in minutes. You can walk into a classroom and get a feel for whether the class is involved in the things they're supposed to be. We can measure it; we call it ALT. It's not easy to measure, but it's a very good predictor of achievement. Why shouldn't it be? It says that kids are engaged. It says that they're succeeding at tasks like the ones that are part of the outcome, and that what they're doing is in fact related to the outcomes. It really is a very interesting variable.

Now, I have to ask you to think for a moment about the variable of ALT again. When we created it we didn't quite have the full picture in mind. We were accused by many educational researchers and psychologists of measuring the measurable. You know, we go out with stop watches and we count things, and we go for the easily countable, the easily measurable, and we never deal with "quality." I hear that all the time. The ALT variable may be revolutionary, in a way, because it may be the first measure we have of quality. I'd like to challenge you to give me a better definition of quality instruction than mine. You walk into a classroom and the kids were working on activities or with materials or dealing with things that are related to outcomes that are valued. They are engaged and they are succeeding at what they are doing. What else do you want? It strikes me that if I walked into a classroom and I could say that, I would be very happy. I can't hold the teacher responsible for the achievement that's going to show up on the test, but I want to be able to hold my teachers responsible for the classroom behavior I observed. Students should be doing things that are related to outcomes, they should be succeeding at them, and they should be engaged in the tasks. It strikes me that that's a pretty good working definition of quality in instruction when you are looking behind classroom doors. And I think, therefore, that the variable is not just easily measurable and just dealing with time. I think it becomes a very important concept for looking into classrooms.

One of the criticisms teachers have always had of the people who look into their classrooms is that they didn't know what to look for. That's why teachers were rated on such things as the neatness of their bulletin board and their clothing. I think with the advent of ALT, we are at the point where we can say, we now know what to look for. We do know what events are likely to produce achievement in classrooms. Is there evidence for this? Well, yes. It's not of the type that might overwhelm the Nobel committee, but it's of the type that might be very useful to an educator.

Let me interpret some of the data in Table 3. Envision three children who start out with a raw score on a test of 36. They're at the 50th percentile on our sample. These are three average kids in the sample we used. They then proceed to work for the next five weeks in their reading and we count the number of minutes each day that we would call ALT, Academic Learning Time. ALT is the number of minutes in which they are engaged in, succeeding, and working on tasks related to the reading outcomes. In one class, the children accumulated 100 minutes of ALT, in another class 573, and in another 1300. The average daily time, in minutes, turns out to be 4 minutes a day, 23 minutes a day, and 52 minutes a day, respectively. The use of the regression equations we created for estimation gives us the following information. Five weeks later we can expect the child who got four minutes a day of ALT to pick up one more item on our test and get a score of 37. The second child gets seven more items on the test right, and gets a score of 43. The third child gets 16 items more and gets a score of 52. They've all been working at reading,

but their growth is different. More important, their placement in that sample is vastly different. Here are three children who start out average and end up, based on ALT, at the 39th percentile, the 50th percentile, and the 66th percentile on the same kinds of tests. It's a pretty powerful variable. At least powerful enough to take seriously.

TABLE 3
ACADEMIC LEARNING TIME AND STUDENT ACHIEVEMENT:
EXAMPLES FROM GRADE 2 READING BASED ON
BTES (PHASE III-B) RESULTS
(A-B PERIOD)

Reading Score at A (October)		Student Engaged Time in Reading with High Success Rate		Estimated Reading Score at B (December)	
Raw Score (out of 100)	Percentile	Total Time Over 5 Weeks (Minutes)	Average Daily Time (Minutes)	Raw Score (out of 100)	Percentile
36	50	100	4	37	39
36	50	573	23	43	50
36	50	1300	52	52	66
16	17	100	4	20	15
16	17	573	23	25	21
16	17	1300	52	35	36

Notes:

1. An average of 25 school days occurred between the A and B testing.
2. The B reading scores are estimated via linear regression.
3. The values of all variables in this table are within the ranges actually obtained in the BTES sample.
4. The average engaged time with high success rate in grade 2 reading for the A-B period was 573 minutes.

In the data I presented to you, it may appear that the range of 4 to 52 minutes a day is unrealistically large. These values, however, actually occurred in the classes in our study. Furthermore, one can easily imagine how either 4 or 52 minutes per day of academic learning time might come about. If 50 minutes of reading instruction per day is allocated to a student who pays attention only about a third of the time and only one fourth of the student's reading time is at a high level of success, then that student will experience only about four minutes a day of engaged reading at a high success level. Similarly if 100 minutes per day is allocated for reading for a student who pays attention 85% of the time at a high level of success

for almost two thirds of the time, then that student will accumulate over 50 minutes a day of ALT. These differences in ALT do result in differences in achievement.

So, I believe ALT is a good predictor. Thus, if you need to go into classrooms and are worried about whether a teacher will be effective or not, why don't you ask some questions like the following: Ask if the time allocated is adequate for the curriculum area or to the content areas within that curriculum area. Ask if the engaged time is sufficient to ensure that what is delivered might actually result in learning. Ask if students appear to be successful in their classroom work. Ask if the work is logically related to the outcomes of the course or the curriculum area. Ask if the pace is sufficient to cover all the objectives held for the course or for that grade level because if the pace is not sufficient, students would not have had the opportunity to learn all they are supposed to learn. In Tucson, I went to a group of teachers in the same grade level who were working with the same Basal series and I said, "Where are you in the teacher's manual that goes with this series?" They said "What do you mean?" And, I said, "What page are you on? How much of it did you cover?" Well, some were done and had been done for a month, and were on to all sorts of reading enrichment programs. Some were on page 99 of a 400 page teacher's manual. That's pace. The raw amount covered would seem to be a good predictor of achievement. Why not? If people aren't exposed to certain things, they're not likely to do well on tests of those things. In the cross national comparisons between the United States and other countries, the single most important variable explaining differences in the achievement of different countries was whether or not students in those countries had been exposed to the content.

Then, after you ask that set of questions, you have to arm yourself with some observational instruments that reflect a set of teaching variables that you believe in to see how those variables might affect the delivery of the curriculum. What teaching variables should you look for? What are the ones to have faith in? I think everyone has to find that out for themselves and read the literature for themselves. I'll tell you what my favorites are from my research and my reading of the literature. I think most of this list would be agreed to by other people, but certainly not all of it. Structuring feedback, monitoring, conviviality, handling transitions, management of deviance, safety, order and academic focus are some of the things I look for when I go into a classroom.

I look at structuring because it tells children what to expect. By structuring we mean the teacher tells the kids what they should be doing. Instead of the teacher saying, "O.K. spelling", the teacher says, "We're doing spelling. We're on page 47 of the workbook. Everybody get out your spelling books and those of you that are excused from it, here's what you're to do." They structure the activity. Why is this important? A couple of reasons. Kids often don't know what the command "spelling" means. In a highly mobile

society like ours, we're dealing with 50, 60 and 100 percent turnover in some of the urban areas. The teacher may present the rules for classrooms early in the year, but by mid-year most of those kids are gone and the teacher then is assuming that the shorthand way of telling kids what's to be done is understood. Some of those kids haven't got a clue! The teachers who structure tell students what's expected, where to be in the material, and give directions. Teachers who structure seem to be those that in fact have higher achievement. Of course it can be abused. We saw one study done at Wisconsin where the instructions for what to do far exceeded the doing of one workbook page. The teacher went on 20 minutes about how to do it and the kids were through in three. There are extremes of structuring.

I look at feedback because our research says that academic feedback keeps success high. It keeps children from being failures too long. The teacher says, "That's not correct, here's how to do it." A teacher who finds ways to provide academic feedback often has children whose success rate is higher, and that's a predictor of achievement.

I look at monitoring because in today's schools, particularly the elementary schools, students have as much as 60% of the school day spent at independent work. Kids work at tables. They work in workbooks. They work on those blue sheets that elves produce at night in schools. Every morning there are stacks of elf-supplied worksheets. And if nobody is monitoring what children do, then it's not unusual to find a second grader not doing it. What does that mean for the teacher? It means you have to wander the class or have an aide who wanders the class and keeps the monitoring rates high.

I look at conviviality, which is our code name for a whole bunch of things. Conviviality shows me that the classroom is a nice place to have kids. It means the attendance is likely to be high, the sickness rate low, the throw-up rate low, the anxiety down. And that's what you want for kids. They can't work unless they feel comfortable and safe.

I look at whether a teacher handles transitions adequately. In our study of management of time in classrooms we had one teacher who was very concerned with having a modern classroom with resource centers all around the classroom--a listening center for reading, a math facts center, a social science center, the hamster center for studying this and that. Every 20 or 30 minutes children would be moving around the classroom and the teacher had what was clearly an exciting place to be. In a 306 minute school day, 76 minutes were clocked as transitional time. The kids were getting into activities and getting out of activities and not spending the time in the activity. One should look at that. The greatest transition problems are with art teachers and physical ed teachers. It takes so long to get ready to do art and physical ed and it takes so long to break it down and put it away that sometimes we actually lose art and physical ed. But the same is true of reading in some classes, and the same is

true of mathematics. The transitions need to be handled. When I go out into classrooms I look at the transitions and their effect on engaged time, because if the transitions are too long, engaged time plummets.

I look at management of deviance and I look for the kind of teacher who has what Kovnin called with-it-ness. I look for teachers who can control the classroom, who make very few timing and targeting errors in the way that Kovnin talks about it, Walter Borg talks about it, the way Emmer and Evertson talk about these concepts now in their handbooks. I look at whether the classroom and the school are safe, orderly, and academically focused because we now know you can't expect achievement in a place that's not orderly or that's not safe. An academic focus is important, but that doesn't mean the teacher can't laugh and joke and have a good time, and that kids can't be happy. It means that after the laughter and the joking, the teacher knows to bring them back to the task at hand.

Summary

Teacher decisions and behavior affect what parts of the curriculum the student learns. They pick the tasks and the time on tasks. Teacher's decisions and behavior affect the success of students in class. Teacher's decisions and behavior affect the students' engagement and the time on the right task in classes. Teacher decisions and behavior affect the students' attitudes toward schools which affect attendance, climate, and management. In my view the teacher decisions and behavior only affect achievement outcomes if they work through student involvement and success with the right tasks. What are the right tasks? At least some of them are the tasks that are used to judge effectiveness. Thus, my original, deceptively simple point is stated again: Teachers who deliver a curriculum to students that is matched to outcomes are likely to be effective. What is nice is that research has helped us find a good classroom indicator of whether effectiveness is likely, that is the ALT variable, consisting of allocated time, engaged time, success rate, and the relationship of activity to outcome. I hope these ideas are helpful as you go out and observe classrooms.

Research and Teacher Effectiveness

These are good times, really. Research on teaching has given us a set of variables to look at that relate to engagement and success. These should be looked at closely. Research has given us an advantage over preceeding generations, and I think you should use that research wisely. The "Nay Sayers" say that our findings are weak, that the correlations are low, that the experimental findings don't always hold up. That may be true but that doesn't mean that research can't produce any useful ideas. The original study of the effect of cigarette smoking on cancerous conditions showed a correla-

tion between smoking and cancerous cells in the lungs of about .14. It's trivial. In education we say "I won't pay any attention to correlations like that." Nevertheless, it makes sense that cigarette smoking is likely to produce some harm. Some of our variables in education make sense, even if the correlations are not high.

I think we're short changing research. Two and three percent increments in our knowledge about what happens to kids are powerful findings. The research that we have now does that. Its strength is also that it is quite useful. For example, the ALT concept may be a way to measure something we think of as "quality." So I think a revolution is taking place. Research is on its way to help us in understanding the elusive nature of quality. We will in time be able to provide insights into instruction that is both "good" and that is "effective." I can't give it all to you in a brief visit like this, but if you'll read widely in this literature and interpret the literature humanly, you'll probably end up thinking of your teachers as handling one of the most complex environments we've ever asked anybody to face.

How do you take care of pace and make sure that everybody gets through, while at the same time you're keeping success rate high? How do you keep engagement high when you've been given mainstreamed kids and you have to pay special attention to one or two kids in your classroom? We've asked the impossible of teachers. The research findings are going to have to be filtered through you, as instructional leaders, and be used humanly in studying the context that you're walking into. The issue of pace may have to be abandoned for part of the school term as the teacher is just simply establishing order. The issue of success rate may have to go by the boards as the teachers bring something else into line. Many teachers say, "I wish you'd come visit in November, I don't get my class started until then." They've had them since September, but they may be right. It takes time to get these systems going, and we can't just apply research evidence and say why aren't you teaching fractions? It may be inappropriate at that time. You have to check with your teachers and use them as guides, too. I've learned to do that as I've talked to them. If you think about the humane use of the research, I think you will find that the research can help you improve your schools.